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**Information technology — Multimedia
framework (MPEG-21) —**

**Part 17:
Fragment Identification of MPEG
Resources**

*Technologies de l'information — Cadre multimédia (MPEG-21) —
Partie 17: Identification de fragments de ressources MPEG*

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 21000-17 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

ISO/IEC 21000 consists of the following parts, under the general title *Information technology — Multimedia framework (MPEG-21)*:

- *Part 1: Vision, Technologies and Strategy* [Technical Report]
- *Part 2: Digital Item Declaration*
- *Part 3: Digital Item Identification*
- *Part 4: Intellectual Property Management and Protection Components*
- *Part 5: Rights Expression Language*
- *Part 6: Rights Data Dictionary*
- *Part 7: Digital Item Adaptation*
- *Part 8: Reference Software*
- *Part 9: File Format*
- *Part 10: Digital Item Processing*
- *Part 11: Evaluation Tools for Persistent Association Technologies* [Technical Report]
- *Part 12: Test Bed for MPEG-21 Resource Delivery* [Technical Report]
- *Part 14: Conformance Testing*
- *Part 15: Event Reporting*

- *Part 16: Binary Format*
- *Part 17: Fragment Identification of MPEG Resources*

The following parts are under preparation:

- *Part 18: Digital Item Streaming*

Introduction

Today, many elements exist to build an infrastructure for the delivery and consumption of multimedia content. There is, however, no “big picture” to describe how these elements, either in existence or under development, relate to each other. The aim for ISO/IEC 21000 (MPEG-21) is to describe how these various elements fit together. Where gaps exist, MPEG-21 will recommend which new International Standards are required. ISO/IEC JTC 1/SC 29/WG 11 (MPEG) will then develop new International Standards as appropriate while other relevant International Standards may be developed by other bodies. These specifications will be integrated into the multimedia framework through collaboration between MPEG and these bodies.

The result is an open framework for multimedia delivery and consumption, with both the content creator and content consumer as focal points. This open framework provides content creators and service providers with equal opportunities in the MPEG-21 enabled open market. This will also be to the benefit of the content consumer providing them access to a large variety of content in an interoperable manner.

The vision for MPEG-21 is to define a multimedia framework *to enable transparent and augmented use of multimedia resources across a wide range of networks and devices* used by different communities.

A key concept of the multimedia framework is the Digital Item. In MPEG-21 a Digital Item is a structured digital object with a standard representation, identification, and metadata. An equally important concept in the multimedia framework is the notion of the User. In MPEG-21 a User is any entity that interacts with the multimedia framework and as such includes all members of the value chain (e.g. creator, rights holders, distributors and consumers of Digital Items) and include, for example, individuals, consumers, communities, organizations, corporations, consortia and governments.

This part of MPEG-21 specifies a normative syntax for URI Fragment Identifiers to be used for addressing parts of MPEG resources. MPEG URI Fragment Identifier schemes offer comprehensive and flexible mechanisms for addressing fragments of audiovisual content. Therefore, their use may also be extended to other audiovisual Internet Media types.

Information technology — Multimedia framework (MPEG-21) —

Part 17: Fragment Identification of MPEG Resources

1 Scope

1.1 General

This International Standard is titled “Fragment Identification of MPEG Resources” and specifies a normative syntax for URI Fragment Identifiers to be used for addressing parts of any resource whose Internet Media Type is one of:

- audio/mpeg [RFC3003];
- video/mpeg [RFC2045, RFC2046];
- video/mp4 [RFC4337];
- audio/mp4 [RFC4337];
- application/mp4 [RFC4337].

MPEG URI Fragment Identifier schemes offer comprehensive and flexible mechanisms for addressing fragments of audiovisual content. Therefore, their use may potentially be extended to other audiovisual Internet Media types.

Such URI Fragment Identifiers are compliant to the generic syntax for URIs defined by IETF RFC 3986 and therefore can be used after the “#” character in a URI. Where appropriate, such Fragment Identifiers can also be used in IRIs as specified by IETF RFC 3987.

The syntax for URI Fragment Identifiers defined in this specification is based on the W3C XPointer Framework Recommendation and adds the ability to address:

- temporal, spatial and spatiotemporal locations of a resource;
- logical units of a resource according to a given Logical Model;
- byte ranges of a resource;
- items or Tracks of an ISO Base Media File;
- a portion of a video through the use of a Mask.

1.2 Organization of this document

This International Standard provides firstly a set of generic principles for addressing fragments of multimedia resources. This set of principles is referred to as MPEG URI Fragment Identifier Framework (Figure 1) and is specified in Clause 4.

Secondly, this International Standards defines a set of normative pointer schemes to be used in the context of the MPEG URI Fragment Identifier Framework. These pointer schemes are specified in Clause 5.

Finally, Clause 6 provides a set of tools for representing Logical Models for various types of media, in order to allow the addressing of fragments of content.

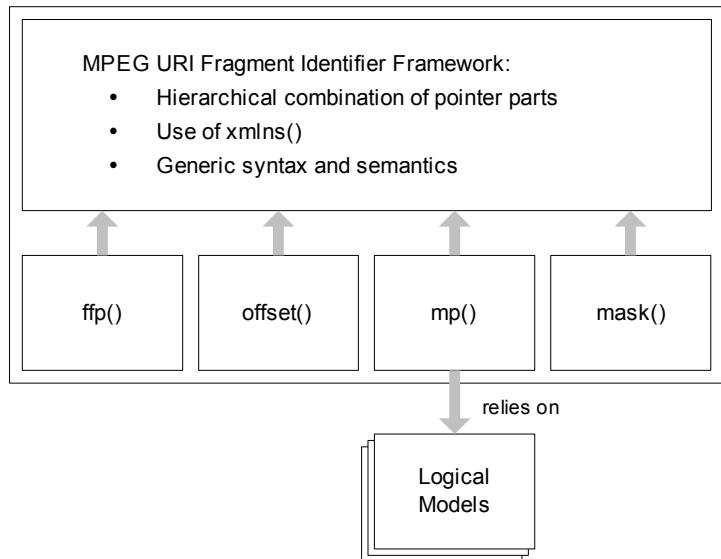


Figure 1 — Scope of this International Standard

This International Standards also provides illustrative (non-normative) examples.

1.3 Relationship with the MPEG-21 Framework

The tools specified in this part of ISO/IEC 21000 allow identification of a part of a resource by providing a format for referencing the part using a Fragment Identifier. The Fragment Identifiers defined in this International Standards are distinct from the Digital Item Identifiers specified in ISO/IEC 21000-3 for identifying the “fundamental units of trade” within the MPEG-21 Multimedia Framework (i.e. Digital Items).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO/IEC 10646, *Information technology — Universal Multiple-Octet Coded Character Set (UCS)*

ISO/IEC 13818-6, *Information technology — Generic coding of moving pictures and associated audio information — Part 6: Extension for DSM-CC*

ISO/IEC 14496-12, *Information technology — Coding of audio-visual objects — Part 12: ISO base media file format*

ISO/IEC 15938-5, *Information technology — Multimedia content description interface — Part 5: Multimedia description schemes*

W3C Recommendation *Extensible Markup Language (XML) 1.0 (Third Edition)*, 04 February 2004, <http://www.w3.org/TR/REC-xml/>

W3C Recommendation *XML Schema Part 0: Primer, Second Edition*, 28 October 2004,
<http://www.w3.org/TR/xmlschema-0/>

W3C Recommendation *XML Schema Part 1: Structures, Second Edition*, 28 October 2004,
<http://www.w3.org/TR/xmlschema-1/>

W3C Recommendation *XML Schema Part 2: Datatypes, Second Edition*, 28 October 2004,
<http://www.w3.org/TR/xmlschema-2/>

W3C Recommendation *XML Path Language, Version 1.0*, 16 November 1999, <http://www.w3.org/TR/xpath>

W3C Recommendation *XPointer Framework*, 25 March 2003, <http://www.w3.org/TR/xptr-framework/>

W3C Recommendation *XPointer xmlns() Scheme*, 25 March 2003, <http://www.w3.org/TR/xptr-xmlns/>

W3C Recommendation *Namespaces in XML*, 14 January 1999, <http://www.w3.org/TR/REC-xml-names/>

SMPTE (Society of Motion Picture and Television Engineers) 12M-1999, *Television, Audio and Film — Time and Control Code*

IETF RFC 2045, *Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies*, <http://www.ietf.org/rfc/rfc2045.txt>

IETF RFC 2046, *Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types*, <http://www.ietf.org/rfc/rfc2046.txt>

IETF RFC 2234, *Augmented BNF for Syntax Specifications: ABNF*, November 1997, including the following core ABNF syntax rules defined by that specification: ALPHA (letters), DIGIT (decimal digits), and HEXDIG (hexadecimal digits), <http://www.ietf.org/rfc/rfc2234.txt>

IETF RFC 3003, *The audio/mpeg Media Type*, <http://www.ietf.org/rfc/rfc3003.txt>

IETF RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax*, <http://www.ietf.org/rfc/rfc3986.txt>

IETF RFC 3987, *Internationalized Resource Identifiers (IRIs)*, <http://www.ietf.org/rfc/rfc3987.txt>

IETF RFC 4337, *MIME Type Registration for MPEG-4*